Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims in the above-identified application:

Listing of Claims

1-66. **Cancelled**

67. **(Original)** A method for use in fabrication of integrated circuits comprising:

providing a substrate assembly comprising a surface, wherein the surface comprises oxygen;

forming a first metal layer on at least a portion of the surface;

forming a second metal layer on at least a portion of the first metal layer;

forming an oxidation diffusion barrier layer on at least a portion of the second metal layer; and

causing oxygen to diffuse through the first metal layer to oxidize one or more regions of the second metal layer.

68. **(Original)** The method of claim 67, wherein causing oxygen to diffuse through the first metal layer to oxidize regions of the second metal layer comprises thermally treating the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon.

69. **(Original)** The method of claim 68, wherein thermally treating the substrate assembly comprises annealing the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon at a temperature greater than 300 °C.

70. **(Original)** The method of claim 69, wherein annealing the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon

comprises annealing the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon in a non-oxidizing atmosphere.

71. **(Original)** The method of claim 67, wherein the first metal layer comprises at least one metal selected from a group consisting of platinum, palladium, rhodium, and iridium.

72. **(Original)** The method of claim 71, wherein the first metal layer comprises platinum.

73. **(Original)** The method of claim 67, wherein the second metal layer comprises at least one metal selected from a group consisting of ruthenium, osmium, rhodium, iridium, and cerium.

74. **(Original)** The method of claim 73, wherein the second metal layer comprises ruthenium.

75. **(Original)** The method of claim 67, wherein the oxidation diffusion barrier layer comprises at least one of silicon nitride, silicon oxynitride, and aluminum oxide.

76. **(Original)** The method of claim 67, wherein the method further comprises removing the oxidation diffusion barrier layer and unoxidized portions of the second metal layer.

77. **(Original)** The method of claim 76, wherein removing the unoxidized portions of the second metal layer comprises removing the unoxidized portions of the second metal layer relative to the metal oxide regions using at least one of a wet etch and a dry etch.

78. **(Original)** A method for use in fabrication of integrated circuits comprising:

providing a substrate assembly comprising a surface, wherein the surface comprises oxygen;

forming a first metal layer on at least a portion of the surface, the first metal layer comprising one or more grain boundaries;

forming a second metal layer on at least a portion of the first metal layer; and

forming metal oxide regions on at least portions of the first metal layer through oxidation of at least portions of the second metal layer by diffusion of oxygen through one or more grain boundaries of the first metal layer.

79. **(Original)** The method of claim 78, wherein forming metal oxide regions on at least portions of the first metal layer comprises:

providing an oxidation diffusion barrier layer on at least a portion of the second metal layer;

thermally treating the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon to selectively oxidize one or more regions of the second metal layer at the one or more grain boundaries of the first metal layer resulting in the one or more metal oxide regions and unoxidized portions of the second metal layer; and

removing the oxidation diffusion barrier layer and the unoxidized portions of the second metal layer.

80. **(Original)** The method of claim 79, wherein thermally treating the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon comprises annealing the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon at a temperature greater than 300 °C.

81. **(Original)** The method of claim 80, wherein annealing the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon comprises annealing the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon in a non-oxidizing atmosphere.

82. **(Original)** The method of claim 79, wherein removing the unoxidized portions of the second metal layer comprises removing the unoxidized portions of the second metal relative to the metal oxide regions using at least one of a wet etch and a dry etch.

83. **(Original)** The method of claim 78, wherein the first metal layer comprises at least one metal selected from a group consisting of platinum, palladium, rhodium, and iridium.

84. **(Original)** The method of claim 83, wherein the first metal layer comprises platinum.

85. **(Original)** The method of claim 78, wherein the second metal layer comprises at least one metal selected from a group consisting of ruthenium, osmium, rhodium, iridium, and cerium.

86. **(Original)** The method of claim 85, wherein the second metal layer comprises ruthenium.

87. **(Original)** The method of claim 78, wherein the oxidation diffusion barrier layer comprises at least one of silicon nitride, silicon oxynitride, and aluminum oxide.

88. **(Original)** A method for use in fabrication of integrated circuits comprising:
providing a substrate assembly comprising a surface, wherein the surface comprises oxygen;
forming a platinum layer on at least a portion of the surface;
forming a ruthenium layer on at least a portion of the platinum layer; and
forming ruthenium oxide regions on at least portions of the platinum layer through selective oxidation of the ruthenium layer.

89. **(Original)** The method of claim 88, wherein forming ruthenium oxide regions on at least portions of the platinum layer through selective oxidation of the ruthenium layer comprises:
providing an oxidation diffusion barrier layer on at least a portion of the ruthenium layer;

thermally treating the substrate assembly having the platinum layer, ruthenium layer, and oxidation diffusion barrier layer formed thereon to selectively oxidize one or more regions of the ruthenium layer by diffusion of oxygen through one or more grain boundaries of the platinum layer.

90. **(Original)** The method of claim 89, wherein thermally treating the substrate assembly having the platinum layer, ruthenium layer, and oxidation diffusion barrier layer formed thereon comprises annealing the substrate assembly having the platinum layer, ruthenium layer, and oxidation diffusion barrier layer formed thereon at a temperature greater than 300 °C.

91. **(Original)** The method of claim 89, wherein annealing the substrate assembly having the platinum layer, ruthenium layer, and oxidation diffusion barrier layer formed thereon comprises annealing the substrate assembly having the platinum layer, ruthenium layer, and oxidation diffusion barrier layer formed thereon in a non-oxidizing atmosphere.

92. **(Original)** The method of claim 89, wherein the thermal treatment results in the one or more ruthenium oxide regions and unoxidized ruthenium portions of the ruthenium layer, and further wherein the method comprises removing the oxidation diffusion barrier layer and the unoxidized portions of the ruthenium layer.

93. **(Original)** The method of claim 92, wherein removing the unoxidized ruthenium portions of the ruthenium layer comprises removing the unoxidized ruthenium portions of the ruthenium layer relative to the ruthenium oxide regions using at least one of a wet etch and a dry etch.

94. **(Original)** The method of claim 92, wherein removing the unoxidized ruthenium portions of the ruthenium layer results in a first electrode of a capacitor structure comprising the

first metal layer and the one or more ruthenium oxide regions formed thereon, and further wherein the method comprises:

forming a dielectric material over at least a portion of the first electrode; and

forming a second electrode on at least a portion of the dielectric material.

95. **(Original)** The method of claim 88, wherein the oxidation diffusion barrier layer comprises at least one of silicon nitride, silicon oxynitride, and aluminum oxide.

96. **(Original)** A method for forming a capacitor comprising:

providing a substrate assembly comprising a surface material, wherein the surface material comprises oxygen;

forming a first electrode on at least a portion of the surface material, wherein forming the first electrode comprises:

forming a first metal layer on at least a portion of the surface material,

forming a second metal layer on at least a portion of the first metal layer,

forming an oxidation diffusion barrier layer on at least a portion of the second metal layer,

oxidizing at least a portion of the second metal layer to form one or more metal oxide regions by thermal treatment of the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon, and

removing the oxidation diffusion barrier layer and unoxidized portions of the second metal layer;

forming a dielectric material over at least a portion of the first electrode; and

forming a second electrode on at least a portion of the dielectric material.

97. **(Original)** The method of claim 96, wherein oxidizing at least a portion of the second metal layer to form one or more metal oxide regions by thermal treatment comprises annealing

the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon at a temperature greater than 300 °C.

98. **(Original)** The method of claim 97, wherein annealing the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon comprises annealing the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon in a non-oxidizing atmosphere.

99. **(Original)** The method of claim 96, wherein the first metal layer comprises at least one metal selected from a group consisting of platinum, palladium, rhodium, and iridium.

100. **(Original)** The method of claim 99, wherein the first metal layer comprises platinum.

101. **(Original)** The method of claim 96, wherein the second metal layer comprises at least one metal selected from a group consisting of ruthenium, osmium, rhodium, iridium, and cerium.

102. **(Original)** The method of claim 101, wherein the second metal layer comprises ruthenium.

103. **(Original)** The method of claim 96, wherein the oxidation diffusion barrier layer comprises at least one of silicon nitride, silicon oxynitride, and aluminum oxide.

104. **(Original)** The method of claim 96, wherein removing the unoxidized portions of the second metal layer comprises removing the unoxidized portions of the second metal relative to the one or more metal oxide regions using at least one of a wet etch and a dry etch.

105. **(Original)** A method for use in formation of a capacitor comprising:

providing a substrate assembly comprising a surface, wherein the surface comprises oxygen;

forming a first electrode on at least a portion of the surface, wherein forming the first electrode comprises:

forming a first metal layer on at least a portion of the surface portion,

forming a second metal layer on at least a portion of the first metal layer, and

forming one or more metal oxide regions on at least portions of the first metal layer through selective oxidation of the second metal layer;

forming a dielectric material over at least a portion of the first electrode; and

forming a second electrode on at least a portion of the dielectric material.

106. **(Original)** The method of claim 105, wherein forming metal oxide regions comprises:

providing an oxidation diffusion barrier layer on at least a portion of the second metal layer;

thermally treating the substrate assembly having the first metal layer, second metal layer, oxidation diffusion barrier layer formed thereon to selectively oxidize one or more regions of the second metal layer by diffusion of oxygen through one or more grain boundaries of the first metal layer resulting in the one or more metal oxide regions and unoxidized portions of the second metal layer; and

removing the oxidation diffusion barrier layer and the unoxidized portions of the second metal layer.

107. **(Original)** The method of claim 106, wherein thermally treating the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer comprises annealing the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon at a temperature greater than 300 °C.

108. **(Original)** The method of claim 107, wherein annealing the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon comprises annealing the substrate assembly having the first metal layer, second metal layer, and oxidation diffusion barrier layer formed thereon in a non-oxidizing atmosphere.

109. **(Original)** The method of claim 106, wherein removing the unoxidized portions of the second metal layer comprises removing the unoxidized portions of the second metal relative to the metal oxide regions using at least one of a wet etch and a dry etch.

110. **(Original)** The method of claim 105, wherein the first metal layer comprises at least one metal selected from a group consisting of platinum, palladium, rhodium, and iridium.

111. **(Original)** The method of claim 110, wherein the first metal layer comprises platinum.

112. **(Original)** The method of claim 105, wherein the second metal layer comprises at least one metal selected from a group consisting of ruthenium, osmium, rhodium, iridium, and cerium.

113. **(Original)** The method of claim 112, wherein the second metal layer comprises ruthenium.

114. **(Original)** The method of claim 105, wherein the oxidation diffusion barrier layer comprises at least one of silicon nitride, silicon oxynitride, and aluminum oxide.